

FY03 Goals – Publish Life Cycle Analysis Chapter

The purpose of this goal (Life Cycle Assessment) was to provide a tool to be used in assessing the most environmentally preferable alternative for projects outside of Sustainable Design (construction and other similar large building projects). Instructions, including this tool – to be developed on a per-project basis, were to be included in the Environmental Programs Manual (EPM) as a new chapter. The Life Cycle Assessment (LCA) chapter was incorporated into the EPM during September, 2003.

LCA refers to the comprehensive examination of a product's environmental and economic aspects and potential impacts throughout its lifetime, including raw material extraction, transportation, manufacturing, use, and disposal per Executive Order 13101. The International Standards Organization has defined the life cycle assessment slightly different as follows: Compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle. The use of the term in this document will imply that the intent of both definitions will be satisfied within this policy.

The NASA Glenn Research Center (GRC) is committed to environmental protection consistent with environmental laws and regulations, Presidential Executive Orders (EO's), the Federal policy on "Greening the Government", other NASA policies, and the GRC environmental policies and programs. GRC has adopted an environmental policy as part of the recently adopted Environmental Management System (EMS), which states: *"GRC operates in a manner that preserves and protects the environment through pollution prevention, the continual improvement of our operations, and complying with regulations"*. The GRC Environmental Programs Manual further delineates this policy and all related implementation strategies. Successful implementation of this pollution prevention plan is a high priority goal for GRC.

NASA Procedures and Guidelines (NPG) documents that pertain to the life cycle assessment plan include the policy NPD 8820.3 Facility Sustainable Design, NPG 8820.3 Pollution Prevention and NPG 8830.1 Affirmative Procurement Plan for Environmentally Preferable Products. This plan will be revised annually or more often to address new requirements promulgated by regulatory agencies or established by NASA HQ and GRC. NASA's sustainable design NPD 8820 policy describes the strategy for implementation of life cycle costing incorporated into the daily decision-making process. However, the development of the sustainable design program is an ongoing agency-wide effort being lead by NASA HQ. In the interim, all NASA engineers and architects, as well as contractors, are encouraged to apply the principles of life cycle costing and sustainable design, to the extent practical regarding buildings, new construction, renovations and other facilities modifications.

The programs established and implemented by this plan will be closely integrated with the Pollution Prevention (P2) and Greening the Government (GTG) Chapter 6 and the AP/EPP Program new Chapter 39 coming soon.

Purchasing products off the AP/EPP listings will automatically incorporate life cycle strategies into a project or operation. A set of generic life cycle assessment, analyses and costing tools and procedures have been developed which can be used to compare the life-cycle costs of various alternatives for a given project. Both a qualitative assessment and a quantitative cost analysis are needed to cover the full range of life cycle issues. The generic tools developed include a Project Description page, an LCA Issues page (to be completed by the LCA program developer), a Qualitative Assessment Matrix page, a Quantitative Assessment Matrix page, and an LCA Summary Matrix page in an electronic spreadsheet file.

The qualitative assessment addresses how well the proposed item/activity options meet life-cycle criteria that are not easily expressed numerically. However, this evaluation might provide evidence of a clear preferred option. If needed, a more detailed quantitative analysis, which includes the key metrics of inputs and outputs of an operation can be conducted. This analysis will provide a numerical evaluation of the life-cycle cost effectiveness for each project alternative studied.

Combining both a qualitative assessment and a quantitative evaluation into a summary matrix provides insight useful in making life cycle conscious decisions.